

## SEQUENCE LISTING

<110> GSF - Forschungszentrum für Umwelt und Gesundheit GmbH

<120> Retroviral expression vectors on the basis of  
HERV-LTR-sequences

<130> P12088

<140> PCT/EP00/02064

<141> 2000-03-09

<150> DE 199 10 650.9

<151> 1999-03-10

<160> 47

<170> PatentIn Ver. 2.1

<210> 1

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<213> Human endogenous retrovirus

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&lt;212&gt; DNA

&lt;213&gt; Human endogenous retrovirus

&lt;400&gt; 9

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&lt;211&gt; 314

&lt;212&gt; DNA

&lt;213&gt; Human endogenous retrovirus

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&lt;210&gt; 11

&lt;211&gt; 309

&lt;212&gt; DNA

&lt;213&gt; Human endogenous retrovirus

&lt;400&gt; 11

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&lt;212&gt; DNA

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&lt;212&gt; DNA

&lt;213&gt; Human endogenous retrovirus

&lt;400&gt; 27

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&lt;212&gt; DNA

&lt;213&gt; Human endogenous retrovirus

&lt;400&gt; 28

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&lt;212&gt; DNA

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gccttcgcga gtttttgtgt cctgggtact tgagattagg gagtggatgat gactcttaag 360
gagcatgctg ccttcaagca tctgtttaac aaagcacatc ctgcaccgcc cttaatccat 420
tcaaccctga gttgacacag cacacgtttc agagagcacg gggttggggg taaggtcata 480
gattaacaga atctcaaggc agaagaattt ttcttaacac ataacaaaat ggagtcctcc 540
atgtctactt ctttctacac agacacagta acaatctgat ctctcttgct tttcccaca 600
tttccccctt ttcttttcga caaaaccgcc atctcgagat ctgagt                                646
```

<210> 31  
 <211> 672  
 <212> DNA  
 <213> Human endogenous retrovirus

```
<400> 31
gtccacctc cagccctaag gcggtttttc cctatctcag tagatggagc atacaatcgg 60
gttttatacc gagacattcc attgccagg gacaggcagg agacagatgc ctctctcttg 120
tctcaactgc aagaggcatt cttcctctt atactaatcc tcctcagcac agacccttta 180
cgggtgtcgg gctgggggac ggtcaggctt ttccttccc acgaggccat atttcagact 240
atcacatggg gagaaacctt ggacaatacc tggctttcct aggcagaggt ccctgcggcc 300
ttccgcagtt tttgtgtcct gggtacttga gattagggag tggatgatgac tcttaaggag 360
catgtgcct tcaagcatct gtttaacaag gcacatcctg caccgccctt aatccattca 420
accctgagtt gacacagcac acgtttcaga gagcacgggg ttgggggtaaa ggtcatagat 480
taacagaatc tcaaggcaga agaatttttc ttaacacata acaaaatgga gtctcccatg 540
tctacttctt tctacacaga cacagtaaca atctgatccc tcttgctttt cccacattt 600
cccccttttc ttatccatca cactggcggc cgctcgagca tgcattctaga gggcccaatt 660
cgccctatag tg                                672
```

<210> 32  
 <211> 593  
 <212> DNA  
 <213> Human endogenous retrovirus

```
<400> 32
agtagatgga gcataacaatc gggttttata ccgagacatt ccattgcccga gggacaggca 60
ggagacagat gccttcctct tgtctcaact gcaagaggca ttccttcctc ttttactaat 120
cctcctcagc acagaccctt tacagggtgc gggctggggg acggtcaggc ctttcccttc 180
ccacgaggcc atatttcaga ctatcacatg gggagaaacc ttggacaata cctggctttc 240
ctaggcagag gtccctgcyg ccttctgcag tttttgtgtc cctgggtact tgagattagg 300
gagtggatgat gactcttaag gagcatgctg ccttcaagca tctgtttaac aaagcacatc 360
ctgcaccgcc cttaatccat tcaaccctga gttgacacag cacatgtttc agagagcacg 420
gggttggggg taaggtcata gattaacaga atctcaaggc agaagaattt ttcttagcac 480
ataacaaaat ggagtcctct atgtctactt ctttctacac agacacagta acaatttgat 540
ctctcttgct tttcccaca tttccccctt ttcttttcga caaaaccgcc atc                                593
```



<210> 33  
 <211> 943  
 <212> DNA  
 <213> Human endogenous retrovirus

<400> 33  
 tgtgggcgaa ggattaccca ggtgccgagg caagagactg aaggcacaaa ctgtttcagt 60  
 ataatataga aaatagctag aataagaata gttataataa aaattagata tacacatgat 120  
 catggacatt accaatcatt actacaaaca ttgttaataa ttagctttta atattactct 180  
 ttgttttatt actaatataa ccaaggaata accggtagca tacggtcagg tgctgaaggg 240  
 acattgtgag aagtgacctt gaaggcaaga ggtgagcctt ctgtcacgcc tgcataagga 300  
 cagcttgagg gctccttggt caagctgtaa caccagtgcc tgggaaggca ccgttactta 360  
 gcagaccatg aaagggagtc tccattcctt ggaggagtca gggaaacact atgctccacc 420  
 agcttcttgt gtatccagcc ctgccacag tcatccagag gcataaaccc ctccctgtgg 480  
 tgctgtgctt caatggccat gcttcttgct cactttcatg ttctctctgt actcctgggt 540  
 cctctttgaa gttcgtagaa gataatggta gaagaaatag tgaaagtctt tgatctttct 600  
 tataagtga tagaagaaaa cactgatgta tgctgcctt ccctctctgc ttcagctacc 660  
 taaaaggaaa ggccccctt cccatgatca catgacttgc ctgaccttat caatcacttg 720  
 gaggactcac cctccttacc ctgtccctt gtcttgtatg caataaatat cagcacgccc 780  
 agccattcgg ggccactact ggtctccgca acttggtggt agtggtacct tgggcccagc 840  
 tgttttctct ttatctctt tgtcttgtgt ctttatttct tacaatctct catctctgca 900  
 catggggaga acaccggcaa agcccgtagg gctggacctt aca 943

<210> 34  
 <211> 389  
 <212> DNA  
 <213> Human endogenous retrovirus

<400> 34  
 aaacccctcc ctgtggtgct gtgcttcaat ggccatgctt cttgtccact ttcattgttc 60  
 tcctgtactc ctggttcctc tttgaagttc gtagaagata atggtagaag aaatagtgaa 120  
 agtctttgat ctttcttata agtgcataga agaaaacact gatgtatgcc tgccttccct 180  
 ctctgcttca gctacctaaa aggaaaggcc ccctttccca tgatcacatg acttgctga 240  
 ccttatcaat cacttgagg actcaccctc cttaccctgt ccctttgtct tgtatgcaat 300  
 aaatatcagc acgcccagcc attcggggcc actactggtc tccgcaactt ggtggtagt 360  
 gtaccctggg ccagctggt ttctcttta 389

<210> 35  
 <211> 858  
 <212> DNA  
 <213> Human endogenous retrovirus

<400> 35  
 tgtgggcgga agagtaccta ggtgccgagg caagagactg aaggcacaaa ctgtttcagt 60  
 ataataaaga aaatagaata agaatagtca taatacaaat tagatacagc gatgatcatg 120  
 aacaattatc catcattatt ataaacatta ttaatcatta gcttttaata ttactctgtt 180  
 gcattaataa tataacctag gaataaccgg caggtatagg gtcagggtgct gaagggacat 240  
 tgtgagaagt gaatagaagg caagagggga gccttctgtc atgcccgat aaggggcgct 300  
 tgaggggccc ttggtcaagc ggtaacgcca ggtcttgga aggcaccgt tactgagcag 360  
 accgggaaag ggagtctcct ttccttgagg gagtcaaggga acgctctgct ccaccagctt 420  
 cttgtgggag gctggatggt acccaggcct gcctgcagtc atccggaggc ctgaaccctt 480  
 ccctgtggtg cttcaatggt caggttccct gtccactttc atgctccttc cgtactcctg 540  
 gttcctcttt gaagtctgta gtagatagcg gtagaagaaa tagtgaaagt cttaaagtct 600  
 ttgatcttat aagttcatag aagaaaacgc tgatgcctgc cgccttctct ctctgcttca 660  
 gctacctaa aggggaagggc ccgctgtcct gtgatcagggt gacttgcttc accttgctca 720  
 tcaactagaa gactgacct ccttatectg ccccttctgc ttgtatgcaa taaatatcag 780  
 cgagcccagc cgttcagggc cactaccggt ctccgtgtct ttgtggtagt ggtccccggg 840  
 ccagctggt ttctcttt 858

<210> 36

<211> 386  
 <212> DNA  
 <213> Human endogenous retrovirus

<400> 36  
 gaacccctcc ctgtggtgct tcaatggtca cgttccttgt ccactttcat gtccttccg 60  
 tactcctggt tcctctttga agttcgtagt agatagcggg agaagaaata gtgaaagtct 120  
 taaagtcttt gatcttataa gttcatagaa gaaaacgctg atgcctgccg ccttctctct 180  
 ctgcttcagc tacctaagag ggaagggccc gctgtcctgt gatcaggtga cttgcttcac 240  
 cttgtcaatc acttagaaga ctgaccctcc ttatcctgcc cccttgtctt gtatgcaata 300  
 aatatcagcg agcccagccg ttcagggcca ctaccgggtct ccgtgtcttt gtggtagtgg 360  
 tccccgggcc cagctgtttt ctcttt 386

<210> 37  
 <211> 844  
 <212> DNA  
 <213> Human endogenous retrovirus

<400> 37  
 tgtgggtgga ggattaccca ggtgcccaagg caagagactg aaggcacaaa ctgtttcagt 60  
 ataataaaaa aaatagaata agaatagtca taatacaaat tagatataga gatgatcatg 120  
 gacaattagc aatcactatt aatcttttagc ttttaatat actctttggt gcattactaa 180  
 tataacctag gaataaccgg tgggtatagg gtcaggtgct gaagggacat tgtgtgaagt 240  
 gacctggaag gcaagagggt agccctctgt cagcccccaca taaggggcgc ttgagggctc 300  
 cttggtcaag tggtaacgcc agtgtctggg aatgcaccgc ttaattagca gaccgcgaaa 360  
 gggagtctcc tttccttgga agagttgggg aacactctgc tccaccagct tcttgtggaa 420  
 ggctggatat tatccaggcc tgcgcgcagt catccggagg cttaaaccct tccctgtggt 480  
 gctgtgcttc aatgggtccca ctccctgtcc actttcatgc tcctcccgta ctccctgttc 540  
 ctctttgaag agcgcagtag atagcggtag aagaaatagt gaaagtctta aagtcttcga 600  
 tctttcttac aagtgcagag aagaaaacgc tgacatatgc tgccttccct ctctgcttcg 660  
 gctacataaa aggggaagggc cgcctatcct gtaatcacat gacttgcttc acctgtcaa 720  
 tcacttagaa gattcactct ccttaccctg ccccctgtc ttgtatgcaa taaatatcag 780  
 tgacccagc cgttcagggc cactactggt ctccgcgtct tgatggtagt ggtcaccccg 840  
 gcc 844

<210> 38  
 <211> 381  
 <212> DNA  
 <213> Human endogenous retrovirus

<400> 38  
 aaacccttcc ctgtggtgct gtgcttcaat ggtcccactc cttgtccact ttcatgctcc 60  
 tcccgctactc ctggttccctc tttgaagagc gcagtagata gcggtagaag aaatagtga 120  
 agtcttaaag tcttcgatct ttcttacaag tgcagagaag aaaacgctga catatgctgc 180  
 cttccctctc tgcttcgggt acctaaaagg gaagggccgc ctatcctgta atcacatgac 240  
 ttgcttcacc ttgtcaatca cttagaagat tcactctcct taccctgccc ccttgtcttg 300  
 tatgcaataa atatcagtga ccccagccgt tcagggccac tactggtctc cgcgtcttga 360  
 tggtagtggt caccgccggc c 381

<210> 39  
 <211> 859  
 <212> DNA  
 <213> Human endogenous retrovirus

<400> 39  
 tgtgggtgga ggattaccca ggtgcccaagg caagagactg aaggcacaaa ctgtttcagt 60  
 ataataaaaa aaatagaata agaatagtca taatacaaat tagatataga gatgatcatg 120  
 gacaattagc aatcactatt aatcttttagc ttttaatat actctttggt gcattactaa 180  
 tataacctag gaataaccgg tgggtatagg gtcaggtgct gaagggacat tgtgagaagt 240  
 gacctggaag gcaagagggt agccctctgt cagcccccaca taaggggcgc ttgagggctc 300

```

cttgggtcaag tggtaacgcc agtgtctggg aatgcacccg ttaattagca gaccgcgaaa 360
gggagtcctcc tttccttggg agagtgtggg aacactctgc tccaccagct tcttgtggaa 420
ggctggatat tatccaggcc tgcgcgcagt catccggagg cttaaaccct tccctgtggt 480
gctgtgcttc aatgggtcca ctcttgtcc actttcatgc tccctccgta ctctgggtc 540
ctctttgaag agcgcagtag atagcggtag aagaaatagt gaaagtctta aagtcttcga 600
tctttcttac aagtgcagag aagaaaacgc tgacatatgc tgccttcct ctctgcttcg 660
gctacctaaa aggggaagggc cgcctatcct gtaatcacat gacttgcttc acctgtcaa 720
tcacttagaa gattcaccct ccttaccctg ccccttgtc ttgtatgcaa taaatatcag 780
tgaccccgag cggttcagggc cactactggt ctccgcgtct tgatggtagt ggtcaccccg 840
gccaggtgt tttttcttt 859

```

<210> 40  
<211> 396  
<212> DNA  
<213> Human endogenous retrovirus

```

<400> 40
aaacccttcc ctgtggtgct gtgcttcaat ggtcccactc cttgtccact ttcattgctcc 60
tcccgtactc ctggttcctc tttgaagagc gcagtagata gcggtagaag aaatagtga 120
agtcttaaag tcttcgatct ttcttacaag tgcagagaag aaaacgctga catatgctgc 180
cttccctctc tgcttcggct acctaaaagg gaagggccgc ctatctgtga atcacatgac 240
ttgcttcacc ttgtcaatca cttagaagat tcacctcct taccctgccc ccttgtcttg 300
tatgcaataa atatcagtga cccagccgt tcagggccac tactggtctc cgctgttga 360
tggtagtggg caccgccgcc caggtgtttt ttcttt 396

```

<210> 41  
<211> 966  
<212> DNA  
<213> Human endogenous retrovirus

```

<400> 41
tgtgggtgga ggattaccca ggtgccgagg caagagactg aaggcacaaa ctgtttcagt 60
ataataaaga aaatggttag aataagaata gtcataatac aaattagata tagagatgat 120
catggacaat tatcaatcat tattataaac attattaatc attagctttt aatattactc 180
tttgttgcatt tactaatata acctaggaat aaccgggtggg tatagggtca ggtgctgaaa 240
ggacattggg agaagtgacc tagaaggcaa gaggtgagtc ttctgtcacg cccgcataag 300
ggttgcttga gggctccttg gtcaagtggg aacgccggtg tctgggaagg cacctgttac 360
ttagccgacc acgaaaggga gtctccttcc cttggaggag tcagggcgca ctctgctcca 420
ccagcttctt gtggaaggct ggatattatc caggcctgcc cgcagtcac cggaggccta 480
aaccctcccc tgtggtgctg tgcttcaatg ggcacactcc tcgtccactt tcatgttctc 540
cccatactcc tgggtttctct ttgaagttcg tagtagatag tggtagaagg aatagggaaa 600
atcttaaagt gtttgatctt tcttataagt gcatagaaga aaacgctgac atatgctgcc 660
ttctctgtct gcttcagcta cctaagaggg aagggccccc tgtccagtga tcacgtgact 720
tgcttcacct tgtcaatcac ttagaagatt caccctcctt accctgcccc cttgtcttgt 780
atgcaataaa tatcagtga cccagccttt cggggccact taccggtctc cacgtcttgg 840
tggtagtggg ccccggggcc cagctgtttt ctctttatct ctttgtcttg tgtcttattt 900
attacaatct ctgctctccg cacacaggga gaacaccgc taagctccgt agggctggac 960
cctaca 966

```

<210> 42  
<211> 398  
<212> DNA  
<213> Human endogenous retrovirus

```

<400> 42
aaacccttcc ctgtggtgct gtgcttcaat gggcacactc ctggtccact ttcattgttc 60
tcccatactc ctggtttctc tttgaagttc gtagtagata gtggtagaag gaataggaa 120
aatcttaaag tgtttgatct ttcttataag tgcatagaag aaaacgctga catatgctgc 180
cttctctgtc tgcttcagct acctaaaggg gaagggcccc ctgtccagtg atcacgtgac 240
ttgcttcacc ttgtcaatca cttagaagat tcacctcct taccctgccc ccttgtcttg 300

```

tatgcaataa atatcagtgcc acccagcctt tcggggccac ttaccgggtct ccacgtcttg 360  
gtggtagtggt tcccccggtc ccagctgttt tctcttta 398

<210> 43

<211> 938

<212> DNA

<213> Human endogenous retrovirus

<400> 43

tgtgggtgga ggattaccca ggtgccgagg caagagactg aaggcacaaa ctgtttcagt 60  
ataataaaga aaatgggttag aataagaata gtcataatac aaattagata tagagatgat 120  
catggacaat tatcaatcat tattataaac attattaatc attagctttt aatattactc 180  
tttgttgcac tactaatata acctaggaat aaccgggtggg tatagggtca ggtgctgaag 240  
ggacattggg agaagtgacc tagaaggcaa gaggtgagtc ttctgtcacg cccgcataag 300  
ggttgcctga gggctccttg gtcaagtggg aacgccgggtg tctgggaagg cacctgttac 360  
ttagccgacc acgaaaggga gtctcctttc cttggaggag tcagggcaca ctctgctcca 420  
ccagcttctt gtggaagggt ggatattatc caggcctgcc cgcagtcacg cggaggccta 480  
aaccctctcc tgtggtgctg tgcttcaatg ggcacactcc tcgtccactt tcatgttctt 540  
cccatactcc tggttcctct ttgaagttcg tagtagatag tggtagaagg aatagggaag 600  
atcttaaagt gtttgatctt tcttataagt gcatagaaga aaacgctgac atagtctgcc 660  
ttctctgtct gcttcagcta cctaagaggg aaggggcccc tgtccagtga tcacgtgact 720  
tgcttcacct tgtcaatcac ttagaagatt caccctcctt accctgcccc cttgtcttgt 780  
atgcaataaa tatcagtgca cccagccttt cggkkcactt accggtctcc acgtcttggt 840  
ggtagtgggt ccccggtcca gctgttttct ctttatctct ttgtcttggt tcttatttat 900  
tacaatctct cgtctccgca cacagggaga acaccgcg 938

<210> 44

<211> 396

<212> DNA

<213> Human endogenous retrovirus

<400> 44

aaaccctctc ctgtggtgct gtgcttcaat gggcacactc ctgtccactt tcatgttctt 60  
tcccatactc ctggttcctc tttgaagttc gtagtagata gtggtagaag gaatagggaag 120  
aatcttaaag tgtttgatct ttcttataag tgcataagaag aaaacgctga catatgctgc 180  
cttctctgtc tgcttcagct acctaagagg gaaggggcccc ctgtccagtg atcacgtgac 240  
ttgcttcacc ttgtcaatca cttagaagat tcaccctcct taccctgccc cttgtcttg 300  
tatgcaataa atatcagtgcc acccagcctt tcggkkcact taccggtctc cacgtcttggt 360  
tggtagtgggt ccccggtccc agctgttttc tcttta 396

<210> 45

<211> 963

<212> DNA

<213> Human endogenous retrovirus

<400> 45

tgtgggcgaa agattaccta ggtgccgagg caagagactg aaggcacaaa ctgtttcagt 60  
ataataaaga aaatagttta aataagaata gttataatac aaattagata tagagatgat 120  
catggacaat tatcaatcat tattataaac attaatcatt agctttttaat attactcttt 180  
gttgctttac taatataacc taggaataac cgggtgggtat agggtcagggt gttgacggga 240  
tattgtgaga agtgacctag aaggcaagag gtgagccttc tgtcacgccc acataagggtc 300  
cgcttgaggg ctctttgggtc aagtggtaac gccagtgtct gtgaaggcac ctgttactta 360  
gcagaccgag aaaggggagtc tcttttcctt ggaggagtca gggaacactc tgctccacca 420  
gcttcttgtg gaaggctgga tattatctag gcctgccccg agtcatcttg aggcctaaac 480  
ccttccctgt ggtgctgtgc ttcatgtggtc actctccttg tccactttca tgttctctcc 540  
gtactccttg ttctcttttg aagttcgtag tagatagcag tagaagaaat agtgaaagtc 600  
ttaaagtatt tgatctttct tataagtgca tagaagaaaa cgctgacata tgctgccttc 660  
tctatctctg cgggtggctac ctaaaaggga agggccccct gtcccatgat catgtgactt 720  
gcttcacctt atcacttaga agattcatcc tcttaccctt gcgccccctc gtcttgatag 780  
caataaatat cagcacgccc agtcgtttga ggccactgcc ggtctccgag tcttggtggt 840

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agtgggtcccc cgggcccagc tattgtctct ttatctcttt gtcttgtgtc tttattttatt 900
acaatctctt gtctctgcac acagggagaa cacctgctaa gccccgtagg actggaccct 960
aca                                                    963

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```

<210> 46
<211> 397
<212> DNA
<213> Human endogenous retrovirus

```

```

<400> 46
aaacccctcc ctgtggtgct gtgcttcagt ggtaactctc cttgtccact ttcattgttcc 60
tcccgtactc ctggttcttc tttgaagttc gtagtagata gcagtagaag aaatagttaa 120
agtcttaaag tatttgatct ttcttataag tgcataagaag aaaacgctga catatgctgc 180
cttctctatc tctgcggtgg ctacctaaaa gggaagggcc ccctgtccca tgatcatgtg 240
acttgcttca ccttatcact tagaagattc atcctcctta ccctgcgccc cctcgtcttg 300
tatgcaataa atatcagcac gccagtcgt ttgaggccac tgccggtctc cgcgtcttgg 360
tggtagtggc cccccgggccc cagctattgt ctcttta 397

```

```

<210> 47
<211> 489
<212> DNA
<213> Human endogenous retrovirus

```

```

<400> 47
tggtcaattc tttgccttct actttttaac ttaacttctc cataaagcaa cttttttcaa 60
tcacctgctc cactctgact cattctgac acctgctcca ccctgactca ttccgatcac 120
ctgatccact gtgactcatt ccgattaccc gctccaccct gactcattct gattctgatt 180
tctgtctctg ccataaccat ttttcccgcc aaaccactca ccctgtcact ctctttaaat 240
tagccaattg gaattagttt agcctgtgcg gtctaaccct agccaatagg ggactgacac 300
agcagcaggg gccacatgtg tcaggaataa gaccccttcc ccctccctgt ccagatgtgt 360
gctcaccatt gctccatctg tgagggcaca cccttctata gaagtaaatt gccttgctga 420
gaagaaaaaa aagaacattt tatattcaag tcctatttct tttgctgcac cgaaacttta 480
tttataaca 489

```